the Netherlands Reference Laboratory for Bacterial Meningitis. Standard methods for cost-effectiveness analysis were used. Analysis was done from a societal perspective, including direct and indirect costs of productivity loss (friction-costs method; price levels in 1998 €; discount rate of 4%). Cost-effectiveness ratios were expressed in net costs per quality adjusted life year (QALY) gained. Sensitivity analysis was performed on several key parameters of the model. **RESULTS:** In the base-case, through vaccination 480 QALYs are gained, while total net costs of the program are €5,546,923. The cost-effectiveness ratio is €11,600 per QALY gained. Sensitivity analysis indicates a cost-effectiveness range of €5,841 to 30,543 per QALY gained. **CONCLUSIONS:** Vaccination of all newborns with meningococcal OMV vaccine has an acceptable cost-effectiveness ratio compared to other interventions in the Netherlands.

ID3

PRELIMINARY EVALUATION OF THE CLINICAL AND ECONOMIC BENEFITS OF UNIVERSAL VARICELLA VACCINATION OF CHILDREN IN GERMANY

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OBJECTIVE: To provide a preliminary assessment of the economic value of vaccinating 1-year old children against varicella in Germany. **METHODS:** We developed a decision-analytic model to compare the clinical and economic outcomes of a universal varicella vaccination program versus no vaccination in infants. The model predicts the clinical effects, direct and indirect costs, and the cost-effectiveness of mass vaccination. Model input data were mainly derived from a large survey conducted across Germany and were complemented by literature data and expert estimates. In the survey, pediatricians, GP's and internists provided information extracted from 1334 randomly selected varicella patient records. Epidemiological data but also medical resource utilization such as physician consultations, medication, and hospitalization due to disease complications was captured. Additionally, work loss of caregivers and infected employed individuals was retrieved from the records. Since the survey was completed only very recently, the analysis of the model input data is preliminary. Valuation of the resources used was done by applying unit costs obtained from official medical tariff lists, drug compendiums, and other statistics. Vaccine efficacy was assumed to be between 90% and 97%, and vaccination coverage between 50% and 80%. Future costs were discounted at 5%. The perspective taken is that of the society. **RESULTS:** The preliminary findings presented here apply to a timeframe of 30 years. Over that period, the model predicts that universal children vaccination could prevent between 7.4 and 11.2 million varicella infections, and between 53,000 and 88,000 major complications depending on the assumptions taken. Universal vaccination also appears to be economically worthwhile with a benefit-cost ratio of between 2.1 and 1.9. **CONCLUSIONS:** These preliminary results suggests that universal varicella vaccination provide significant clinical and economic benefits to the German society. A final analysis is in process, which will be an important information source for healthcare decision-makers.

MULTIPLE DISEASES

MD1

AVOIDABLE HOSPITALIZATION: TRENDS AND ETHNIC VARIATIONS IN SINGAPORE, 1991–1998

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OBJECTIVE: To assess avoidable hospitalization as an outcome indicator of access to and quality of primary care by examining trends and gender and ethnic variations. **METHOD:** Aggregated nationwide data on annual hospital discharges in Singapore from 1991 to 1998 were collected from the Central Claims Processing System (CCPS) database. They included total hospitalizations (excluding maternity and psychiatric disorders) and hospitalizations for chronic diseases, which are avoidable by timely, appropriate and effective primary care (ambulatory care sensitive (ACS) conditions): asthma, congestive heart failure, chronic obstructive pulmonary disease, diabetes mellitus and hypertension. Directly age-standardized rates were adjusted for gender and ethnic differences in total hospitalizations. **RESULTS:** From 1991 to 1998, (total of 1,479,494 hospitalizations), 6.7% were for ACS conditions. Overall, the annual rate of avoidable hospitalization was 29.4 per 10,000 population. Women had lower rates of avoidable hospitalizations than males (22.4 versus 29.5 per 10,000), as well as for total hospitalizations (496.2 versus 515.5 per 10,000). Adjusted for total hospitalization, males were 1.3 times more likely than females to be hospitalized for ACS conditions. Compared to Chinese, Indian and Malays had higher rates of avoidable hospitalizations (21.7, 65.5 and 56.1 per 10,000 respectively). Adjusting for their higher rates of total hospitalization, they were 1.7 and 1.8 times respectively more likely than Chinese to be admitted for ACS conditions. Avoidable hospitalization decline (adjusted for total hospitalization) was −9.1% overall; greater in males (−11.8%) than in females (−5.3%); greater for Chinese (−15.8%), than Malays (−1.1%) and Indians (increase of +4.3%). Among Malays and Indians, women showed marked increases of avoidable hospitalizations, +10.8% and +8.1% respectively. **CONCLU-**